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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,106	05/06/2005	Anthony Hooley	117-536	9140
23117 7590 08/08/2007 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER LUKS, JEREMY AUSTIN	
			ART UNIT 2837	PAPER NUMBER
			MAIL DATE 08/08/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/528,106	HOOLEY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jeremy Luks	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 May 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,6,7,10-13 and 19-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,7,10-13 and 19-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3, 6, 7, 10-13 and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lock (WO 99/67974) in view of Hooley (WO 01/47041). Lock teaches a loudspeaker (Figure 2, #10) comprising first (14) and second (15) essentially identical diaphragms (Page 3, Line 25), the first (14) and second (15) diaphragms being flat panels arranged (Page 14, Lines 13-14) in parallel with a continuous fluid-filled gap between them and having essentially equal impedance, and a plurality of actuators (17, 18) (Page 14, Line 5) coupled by a first end (18) to said first diaphragm (14) and a second end (17) to said second diaphragm (15) to simultaneously excite vibrations in said first (14) and second (15) diaphragm (Page 3, Lines 8-9); the loudspeaker (10) mounted by suspending the diaphragms on cables (Figure 1, #12) extending between the diaphragms (14, 15); and wherein the acoustic output of the first (14) and second (15) diaphragms is balanced. Lock fails to teach wherein the actuators are a coiled-coil piezoelectric benders; wherein the diaphragms are separated by less than one tenth of their smallest lateral dimension; wherein the diaphragms are separated by a average distance of less than ten millimeters; wherein the height of the actuator exceeds a

minimal spacing between the first and the second diaphragm; wherein the at least one piezoelectric actuator is arranged to excite vibrations in said first and second diaphragm in a mixture of a pistonic mode and a bending wave mode. Hooley teaches wherein the actuator(s) is a coiled- coil piezoelectric bender (Figure 58, #581) (Page 36, Lines 3-28); wherein the height of the actuator (581) exceeds a minimal spacing between the first and the second diaphragm when used in combination; and wherein the at least one piezoelectric actuator (581) is arranged to excite vibrations in said first and second diaphragm in a mixture of a pistonic mode and a bending wave mode when used in combination. Further, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the apparatus of Lock, with the apparatus of Hooley because the advantages of this arrangement over the conventional moving coil device include: linearity (especially when combined with a feedback sensing layer as described hereinbefore); a much greater excursion possible from a given size and/or weight of motor assembly; much lower weight (no magnet and yoke assembly); a much higher efficiency (no lossy resistive voice coil); and a more compact assembly. Hooley fails to teach wherein the diaphragms are separated by less than one tenth of their smallest lateral dimension; and wherein the diaphragms are separated by an average distance of less than ten millimeters. However, it would have been an obvious design choice to separate the diaphragms by less than one tenth of their smallest lateral dimension or a distance of less than ten millimeters, since such a

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modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In *re Rose*, 105 USPQ 237 (CCPA 1955). Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working range involves only routine skill in the art. In *re Aller*, 105 USPQ 233.

### ***Response to Arguments***

2. Applicant's arguments filed 5/31/07 have been fully considered but they are not persuasive. The examiner considers the obvious combination of Lock and Hooley to teach all of the limitations as claimed by Applicant.

3. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the Examiner has provided motivation from the Hooley reference stating the advantages of using the electro-active helix device of Hooley over the prior art use of a conventional electromagnetic moving coil device (found in Hooley, Page 36, Lines 3-28).

Additionally, in view of *KSR International Co. v. Teleflex Inc.*, 82 USPQ 2d 1385 (2007), it would have been obvious replace the heavy, unbalanced moving coil device of Lock, with the known, light weight and efficient electro-active helix device of Hooley (Figure

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58, #581) for the predictable result of linearity, a greater excursion possible from the given weight size of the motor assembly and much higher efficiency. Further, the KSR decision affirms that using known techniques (i.e. the electro-active helix #581 of Hooley (See Fig. 58)) to improve similar devices (i.e. loudspeaker #10 including moving-coil driver #16 of Lock) in the same way would have been obvious to one of ordinary skill in the art. The Examiner agrees with Applicant's assessment of the deficiencies of the Lock apparatus (Remarks, Page 5, Paragraph 5), including that the magnet/voice coil driver is unbalanced, heavy and essentially inefficient. The cited passage above from Hooley teaches precisely why it would be advantageous to one of ordinary skill to replace the driver of Lock with the electro-active helix of Hooley in a loudspeaker device.

### ***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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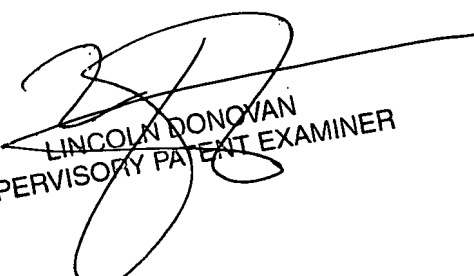
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy Luks whose telephone number is (571) 272-2707. The examiner can normally be reached on Monday-Thursday 8:30-6:00, and alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lincoln Donovan can be reached on (571) 272-1988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Art Unit 2837  
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LINCOLN DONOVAN  
SUPERVISORY PATENT EXAMINER